B.E.I.T. Sem VII (R) 9/12/14

Simulation and Modelling

QP Code :15502

(3 Hours) **[Total Marks : 100**

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions from the **remaining** questions.
(3) Assume **data** if **required** and **specify** your **assumption**.

1. (a) Explain different steps in Simulation study. **10**
(b) How will you validate simulation model ? **10**

2. (a) For the following data find the Queue Statistics. (Time in minutes). IAT denotes inter arrival time and ST denotes the service time. Assume first customer arrives at time = 0. **10**

IAT	–	08	06	01	08	03	08	07	02	03
ST	04	01	04	03	02	04	05	04	05	03

(b) Explain the following terms: Event scheduling, Process interaction, activity scanning, bootstrapping and terminating event **10**

3. (a) The sequence of numbers 0.54, 0.73,0.98,0.11 and 0.68 has been generated. Use the Kolmogorov- Smirnov test with $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0,1] can be rejected given $D\alpha = 0.565$. **10**
(b) Explain various methods for random numbers generation. **10**

4. (a) The following is set of single digit numbers from a random number generator. Using appropriate test check whether the numbers are uniformly distributed. **10**
$N = 50$, $\alpha = 0.05$ and $X^2_{.05,9} = 16.9$.
6, 7, 0, 6, 9, 9, 0, 6, 4, 6, 4, 0, 8, 2, 6, 6, 1, 2, 6, 8, 5, 6, 0, 4, 7
1, 3, 5.0, 7, 1, 4, 9, 8, 6, 0, 9, 6, 6, 7, 1, 0, 4, 7.9, 2, 0, 1, 4, 8
(b) Differentiate random variables and random variates. Generate random variates of exponential distribution. **10**

5. (a) Lt X_1 represent the average lead time to deliver (in months), and X_2 the annual demand, for industrial robots. The following data were available on demand and lead time for the last ten years. Estimate the correlation and co-variance. **10**

Lead Time	6.9	6.5	4.3	6.9	6.0	6.9	5.8	7.3	4.5	6.3
Demand	103	83	116	97	112	104	106	109	92	96

(b) Define correlation and covariance. Explain Time-series model. **10**

6. (a) Derive the steady state parameters of M/G/1 queue and M/M/I. **10**
(b) What are the issues in manufacturing and material handling system. **10**

7. Write short.notes on any **two** :— **20**
(a) Cobweb model.
(b) Probability distributions and the process related to them.
(c) Need for output Analysis in simulations.

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